WHAT IS CLAIMED IS:

1. A method for operating a gas turbine engine including a combustor, said method comprising:

determining the combustor acoustic level amplitude;

comparing the acoustic level to a predetermined upper acoustic limit; and

adjusting a fuel flow distribution to the combustor using a closed loop controller to facilitate reducing the acoustic level to a predetermined lower acoustic limit that is less than the upper acoustic limit.

2. A method in accordance with Claim 1 wherein the combustor includes a plurality of separately-fueled, substantially concentric annular rings, adjusting fuel flow further comprises alternately adjusting fuel flow to each ring using a plurality of separate respective controllers.

3. A method in accordance with Claim 2 wherein adjusting a fuel flow to the combustor comprises determining a flame temperature control adjustment for each respective ring.

4. A method in accordance with Claim 1 wherein determining the combustor acoustic level amplitude comprises determining a filtered measure of the acoustic level amplitude during combustor operations.

5. A method in accordance with Claim 1 wherein adjusting a fuel flow to the combustor comprises determining a polarity of a change in a filtered measure of the acoustic level amplitude.

6. A method in accordance with Claim 1 wherein comparing the acoustic level to a predetermined upper acoustic limit comprises comparing the acoustic level to a predetermined upper acoustic limit using a minimum select function.

7. A method in accordance with Claim 1 wherein the closed-loop controller is a proportional integral controller, said adjusting a fuel flow to the combustor comprises inputting an error signal to the controller that is based on at least one of a polarity of a change in a filtered measure of the acoustic level amplitude, a flame temperature control adjustment, and a filtered measure of the acoustic level amplitude.

8. A method in accordance with Claim 1 wherein adjusting a fuel flow to the combustor further comprises:

monitoring the filtered measure of the acoustic level amplitude for a predetermined length of time; and

if the filtered measure of the acoustic level amplitude is not reduced at the expiration of the predetermined length of time, then at least one of sequentially changing the direction of the controller adjustment, and switching control of fuel flow to another combustor ring.

9. A combustor control system for controlling combustion acoustics in a combustor, the combustor including a plurality of rings, said system comprising:

a combustor acoustics sensor coupled in acoustic communication with the combustor;

a combustion acoustics control circuit coupled to said sensor, said circuit comprising a closed-loop feedback controller; and

a fuel-flow control circuit coupled to said controller, said fuel-flow control circuit configured to control fuel flow to at least one combustor ring.

10. A combustor control system in accordance with Claim 9 wherein said combustor acoustics sensor comprises a high temperature capable dynamic pressure transducer.

11. A combustor control system in accordance with Claim 9 wherein said combustor acoustics sensor is configured to generate a sensed combustor acoustic level.

12. A combustor control system in accordance with Claim 9 wherein said combustion acoustics control circuit is configured to:

compare a filtered measure of an output of said sensor to an acoustic reference signal to generate an error signal;

determine a polarity of the error signal using the sensed acoustic level and a combustor flame temperature control signal; and

transmit the polarized error signal to said closed-loop feedback controller.

13. A combustor control system in accordance with Claim 9 wherein said closed-loop feedback controller comprises a proportional integral controller, said combustion acoustics control circuit configured to generate a combustor flame temperature control signal to control fuel flow distribution to the combustor.

14. A combustor control system in accordance with Claim 9 wherein said closed-loop feedback controller is configured to control fuel flow distribution to a plurality of separately-fueled, substantially concentrically aligned annular rings.

15. A combustor control system in accordance with Claim 9 further comprising a plurality of combustor acoustic sensors coupled in acoustic communication with the combustor, said sensor outputs coupled to a signal conditioning bandpass filter, said combustor control system further configured to select at least one filtered sensor output to generate a sensed combustor acoustic level signal.

16. A gas turbine engine comprising:

a compressor;

a turbine coupled in flow communication with said compressor; and

a combustor system coupled between said compressor and said turbine, the combustor system including a plurality of combustor rings, the combustor system comprising:

a combustor acoustics sensor;

a closed-loop combustor fuel control controller coupled to said sensor; and

a fuel-flow control circuit coupled to said controller, the fuel-flow control circuit configured to control fuel flow to at least one combustor ring.

17. A gas turbine engine in accordance with Claim 16 wherein said combustion acoustics control circuit is configured to:

compare a filtered measure of an output of said sensor to an acoustic reference signal to generate an error signal;

determine a polarity of the error signal using a sensed acoustic level and a combustor flame temperature control signal; and

transmit the error signal and determined polarity to said closed-loop feedback controller.

18. A gas turbine engine in accordance with Claim 16 wherein said closed-loop feedback controller comprises a proportional integral controller, said combustion acoustics control circuit configured to generate a combustor flame temperature control signal to control fuel to the combustor.

19. A gas turbine engine in accordance with Claim 16 wherein said closed-loop feedback controller is configured to control fuel flow to a plurality of separately-fueled, substantially concentrically aligned annular rings.

20. A gas turbine engine in accordance with Claim 16 comprising a plurality of combustor acoustic sensors coupled in acoustic communication with the combustor, said sensor outputs coupled to a signal conditioning bandpass filter, said combustor control system further configured to select a at least one filtered sensor output to generate a sensed combustor acoustic level signal.